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TEST BULLETIN: O.E.C.D. No. 1389 FULL CODE

Report on Test in Accordance with the O.E.C.D. Standard Code FULL CODE
(CODE I) for the Official Testing of Agricultural Tractors



URSUS 1634 (4WD)

Manufactured by Zakłady Przemysłu Ciągnikowego,
Warszawa, Poland

Date of approval 8th September 1992
Serial No. 1389 FULL CODE

This bulletin is based on engineering tests in accordance with the OECD Standard Code for the Official Testing of Agricultural Tractors Performance. It does not contain an evaluation of the performance of the tractor on practical farm work.

This report has been approved by the OECD Co-ordinating Centre (CEMAGREF France) as being in accordance with the OECD Standard Code for the Official Testing of Agricultural Tractors.

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Tractor manufacturer's name and address	Zakłady Przemysłu Ciągnikowego "URSUS" ul. Traktorzystów 10 02-495 Warszawa, Poland
Submitted for test by	The manufacturer
Selected for test by	The manufacturer
Place of running-in	ZM URSUS, Poland
Duration of running-in	50 h
Location of test	VAKOLA, Finland

I. SPECIFICATIONS OF THE TRACTOR

TRACTOR

Make/Model/Type	URSUS /1634/Four wheel drive, unit construction
Number of driving wheels	4
Serial number	00002
First Serial number	00001

ENGINE

Make/Model/Type	ZTS Martin/Z8602.12/ water cooled, 4-stroke, direct injection diesel engine, turbocharged
Serial number	000336
Cylinders	
Number	6
Disposition	Vertical, in line
Bore/Stroke	110 mm/120 mm
Capacity	6842 cm ³
Compression ratio	17:1
Arrangement of valves	Overhead
Cylinder liners	Wet

Supercharging

Make/Model/Type	K 27-2966 U17.21
Pressure	90 kPa

Fuel system

Fuel feed system	Mechanical feed pump
Fuel filters	Two stage, felt and paper element
Capacity of fuel tank	160 dm ³
Injection pump	PAL, piston type, in line

Serial number of injection pump	069Z
Manufacturer's production setting of injection pump:	
Flow rating at rated engine speed and full load	83.4 mm ³ /stroke
Timing	24-2° before TDC
Make/Model/Type of injectors	VP 81S 453 e 2575/multihole
Injection pressure	16.8 + 0.8 MPa
Governor	
Make/Model/Type	PAL/RV3M/1100/mechanical
Governed range of engine speed	From 600 to 2450 rev/min
Rated engine speed	2200 rev/min
Air cleaner	
Pre-cleaner	
Make/Model/Type	Hodrusba-Hamre/PC 750/cyclonic with dust container
Location of air intake	Under engine hood front of the tractor
Main-cleaner	
Make/Model/Type	Hodrusba-Hamre/9470.11/oil bath
Maintenance indicator	None
Lubrication system	
Type of pump	Gear pump
Type of filters	Centrifugal, full flow, RDP3/A
Number	1
Cooling system	
Type of coolant	Anti-freeze
Type of pump	Centrifugal
Number of fan blades	8
Fan diameter	460 mm
Coolant capacity	29 dm ³
Type of temperature control	Thermostat
Superpressure system	30 kPa
Starting system	
Make/Model/Type	ELMOT/R20e/solenoid engaged, 24V
Starter motor power rating	5.5 kW
Cold starting aid	None

Safety device	Only operable when the gear lever is in neutral position
Electrical system	
Voltage	12 V
Generator	
Make/Model/Type	Elmot/A 133-55, alternator
Power	0.66 kW
Battery	
Number	2
Rating	135 Ah at 20 hours
Exhaust system	
Make/Model/Type	URSUS
Location	Vertical on the left hand side of the tractor
TRANSMISSION	
Clutch (travel alone)	
Make/Model/Type	URSUS/single plate/dry
Number of plates	1
Diameter of plates	380 mm
Method of operation	Hydraulically by pedal operated
Gear box	
Make/Model/Type	Povazkie Strojarné/PZ 120/25, syncromesh (2 and 3 gear)
Arrangement	3 forward x 2 ranges x torque amplifier
Number of gears	12 forward, 6 reverse
Available options	Creep gear
Rear axle and final drives	
Make/Model/Type	URSUS/crown wheel and pinion/ Oerlicon type with planetary final drives
Differential lock	
Type	Mechanical, dog clutch
Method of engagement	Pedal
Method of disengagement	Self disengaging
Front axle and final drives	
Make/Model/Type	URSUS/side drive/gleason bevel gears
Differential lock	
Type	Wet disc clutch, hydraulically operated
Method of engagement	Pedal
Method of disengagement	Self disengaging

Total ratios and travelling speeds

Gear no	Group or range	Number of engine revolutions for one revolution of the driving wheels		Nominal travelling speed (*) at rated engine speed of 2200 rev/min km/h	
		Torque amplifier		Torque amplifier	
		H	L	H	L
1	I	212.48	283.32	3.2	2.4
2		130.76	174.35	5.2	3.9
3		78.27	104.98	8.7	6.5
1	II	68.68	91.89	9.9	7.4
2		41.97	56.20	16.2	12.1
3		25.00	33.50	27.2	20.3
1	R	183.77	242.84	3.7	2.8
2		111.47	151.10	6.1	4.5
3		66.66	89.47	10.2	7.6

(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251/1-1984)

Number of revolutions of front wheels for one revolution of rear wheels 1.321

POWER TAKE-OFF**Main power take-off**

Type Independent
Method of engagement Hydraulically, multidisc clutch
Number of shafts 3
Method of changing power take-off shaft ends and speeds By changing PTO shafts:
6 spline for 540 RPM, 21 spline shaft for 1000 RPM and 20 spline shaft for 1000 RPM

Power take-off proportional to engine speed

540 rev/min

Location At the rear of the tractor
Diameter of power take-off shaft end 35 mm
Number of splines 6, in conformity with ISO 500/1979
Height above ground 680 mm

Distance from the median plane of the tractor	0 mm
Distance behind rear-wheel axis	498 mm
PTO speed at rated engine speed (2200 rev/min)	628.6 rev/min
Engine speed at standard power take-off speed	1890 rev/min
Ratio of rotation speeds (engine speed/p.t.o speed)	3.5
Power restriction and maximum torque	48 kW, 850 Nm
Direction of rotation (viewed from behind tractor)	Clockwise
1000 rev/min	
Location	At the rear of the tractor
Diameter of power take-off shaft end	35 mm and 45 mm
Number of splines	21 and 20, in conformity with ISO 500/1979
Height above ground	680 mm
Distance from the median plane of the tractor	0 mm
Distance behind rear-wheel axis	498 mm
PTO speed at rated engine speed (2200 rev/min)	1146 rev/min
Engine speed at standard power take-off speed	1920 rev/min
Ratio of rotation speeds	1.92
Direction of rotation	Clockwise
Power take-off proportional to ground speed	
PTO shaft	
Travelling distance for one revolution of power take-off shaft	0.176 m (540 and 1000) ^{*)}
Number of power take-off shaft revolutions for one revolution of (rear) driving wheels	27.38 (540 and 1000) ^{*)}
Direction of rotation with forward gear engaged	Clockwise
POWER LIFT	
Make/Model/Type	Archimedes Wroclaw
Type of hydraulic system	Internal cylinder with auxiliary ram cylinders, open system
Type and number of cylinders	1+2 single acting

^{*)} The proportional to ground speed power take-off is not connected to pto speeds 540 or 1000, but is independent from those, connected by use of a separate lever.

Type of linkage lock for transport	Hydraulic
Relief valve pressure setting	17.5 ± 0.25 MPa
Opening pressure of cylinder safety valve	19 + 0.5 MPa
Lift pump type	Gear pump PZ2-18 KS
Transmission between pump and engine	0.920
Type and number of filters	2 suction filter, fine filter
Site of oil reservoir	Transmission housing
Type, number and location of tapping points	Quick couplings, 4(6) rear of the tractor
Maximum volume of oil available to external cylinders	25 dm ³

Three point linkage

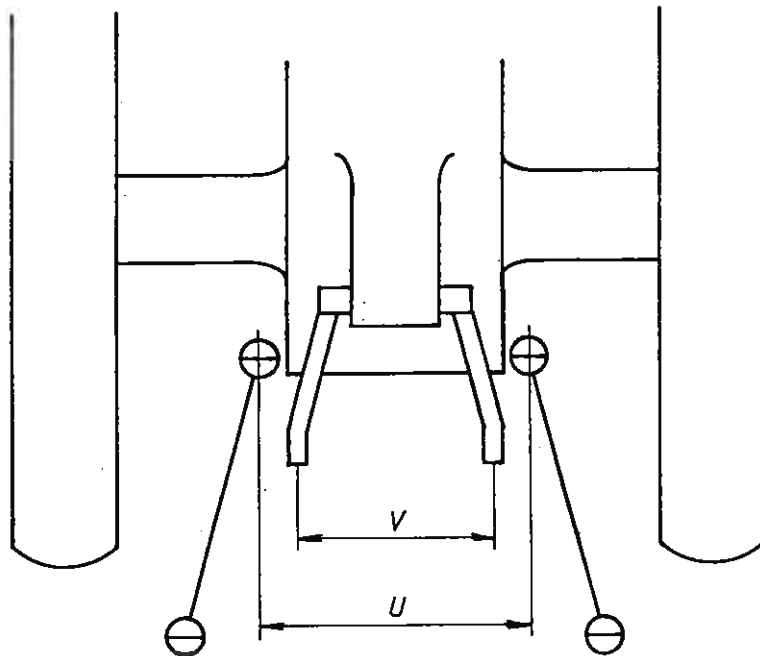
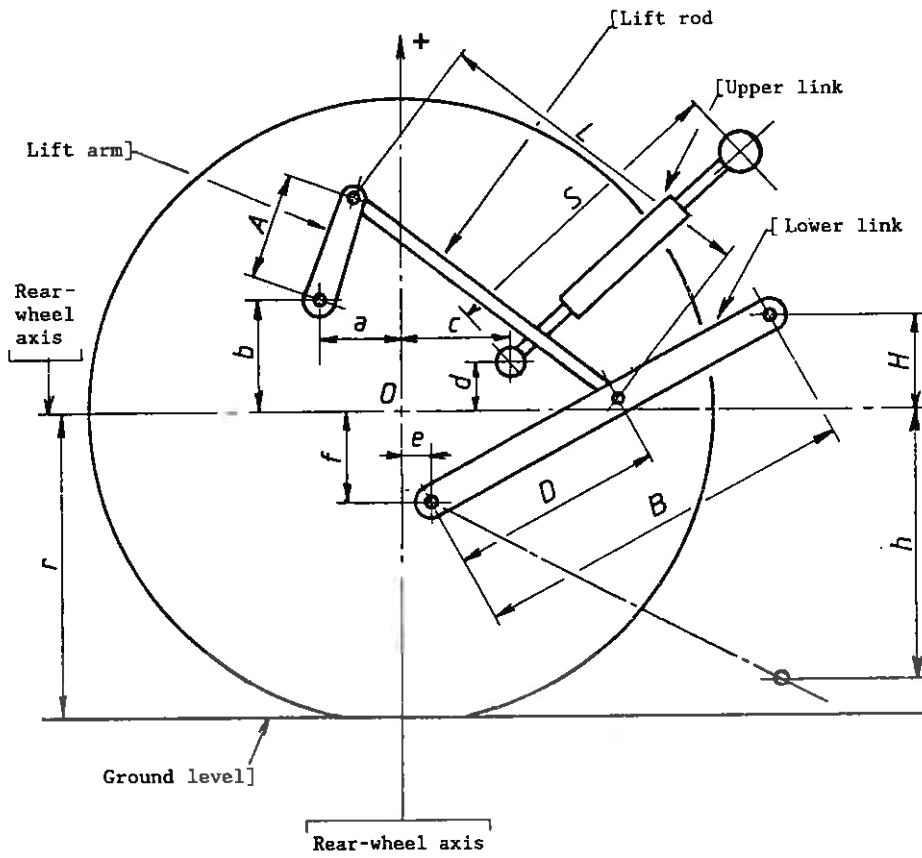
Category 3(2), in conformity with categories 2 and 3 of ISO 730/1-1977

Category adapter None

		Dimension or range mm	Settings used in test mm
Length of lift arms	(A)	330	330
Length of lower links	(B)	984	984
Distance of lift arm pivot point from rear-wheel axis:	horizontally (a)	160	160
	vertically (b)	290	290
Horizontal distance between the 2 lower link point	(u)	525	525
Horizontal distance between the 2 lift arm end points	(v)	643	643
Length of upper link	(S)	from 605 to 825	725
Distance of upper link pivot point from rear wheel axis:	horizontally (c)	375	375
	vertically (d)	100, 160 to 210	210
Distance of lower link pivot point from rear wheel axis:	horizontally (e)	130	130
	vertically (f)	250	250
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	510	510
Length of lift rods	(L)	from 510 to 622	605
Height of lower hitch points relative to the rear-wheel axis:	in low position (h)	from 408 to 645	620
	in high position (H)	from 90 to 290	115
Height above ground of lower hitch points when locked in transport position (*)		from 175 to 1110	

(*) Assuming $r = 820$ mm tyre dynamic radius index of ISO 4251/1-1984.

Table 1.1 Dimensions of linkage geometry



SWINGING DRAWBAR

Type	Universal hitch
Height above ground	390 mm
Type of adjustment	Changing position of fixing bolts and holes
Distance of hitch point from rear wheel axis, horizontally	898 mm, 998 mm
Distance of hitch point from power take-off shaft end	
- vertically	290 mm
- horizontally	400, 500 mm
Lateral adjustment	
right hand	0 - 195 mm
left hand	0 - 195 mm
Distance of pivot point from rear-wheel axis, horizontally	245 mm
Diameter drawbar pin hole	33 mm
Maximum vertical permissible load	7 kN

TRAILER HITCH I

Type	Hitch-hook
Hook diameter	46 mm
Height above ground	471 mm
Distance of hitch point from rear-wheel axis, horizontally	671 mm
Distance of hitch point from power take-off shaft end:	
- vertically	209 mm
- horizontally	173 mm
Maximum vertical permissible load	25 kN

TRAILER HITCH II

Type	Clevis with rubber shock absorber
Hole diameter	31 mm
Height above ground	873 mm
Distance of hitch point from rear-wheel axis, horizontally	806 mm
Distance of hitch point from power take-off shaft end	
- vertically	193 mm
- horizontally	308 mm
Maximum vertical permissible load	9 kN

HOLED DRAWBAR

Number of holes	9
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Distance between holes	80 mm
Hole diameter	32 mm
Thickness/width of the drawbar	72/100 mm
Height above ground	
- minimum	175 mm
- maximum	1110 mm
Horizontal distance to power take-off shaft end (rear)	575 mm

STEERING

Make/Model/Type	Pilmet, hydrostatic
Method of operation	Steering wheel
- pump(s)	1
- ram(s)	1, double acting
Working pressure	11 MPa

BRAKES

Service brake	
Make/Model/Type	Disc/selfenergizing/dry
Method of operation	Two pedals, hydraulically actuated, independent or combined operation
Trailer braking take-off	Air braking system
Parking brake	
Type	Disc, dry, common with service brakes
Method of operation	Mechanically actuated by hand lever

WHEELS

Number	
- front	2 driving and steering
- rear	2 driving
Wheelbase	2710 mm

Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	1710	1810	By changing wheels and rim lugs
Rear	1640	1860	

PROTECTIVE STRUCTURE

Make/Model/Type	URSUS 87.000.113 protective cab
Manufacturer's name and address	Fabryka Maszyn Rolniczych 27-510 Kunow, Poland

Protective device Protective cab, not tiltable
 OECD approval number CSS 0187/1

DRIVER'S SEAT

Make/Model/Type SA 50/1
 Type of suspension Springs
 Type of damping Hydraulic damper
 Range of adjustment:
 - longitudinal 100 mm
 - vertical 60 mm

MISCELLANEOUS None

LIGHTING

	Height above ground centre mm	Size mm	Distance from outside edge of lights to median plane of tractor mm
Headlights	1190	ø 120	240
Sidelights	1970	65 x 65	925
Rearlights	1840	65 x 90	815
Reflector	1420	ø 80	950
	1020	ø 80	485

II. TEST CONDITIONS**Overall dimensions**

	Length mm	Width		Height at top of	
		Minimum mm	Maximum mm	Protective structure mm	Exhaust silencer mm
Ballasted	4610	2300	2395	2980	3000
Unballasted	4505	2300	2395	2980	3000

Ground clearance 395 mm (unballasted tractor)

Clearance-limiting part Hitch hook

**Tractor mass
(with cab):**

	Ballasted		Unballasted	
	Without driver kg	With driver kg	Without driver kg	With driver kg
Front	2810	2820	2010	2020
Rear	4280	4345	3090	3155
Total	7090	7165	5100	5175

Ballast

	Weights		
	Number	Total mass kg	Water kg
Front	22	630	-
Rear	18	510	850

Tyres and track width specifications

	Front	Rear
Tyres:		
- dimensions	14.9-24	18.4-38
- ply rating	8	8
- type	diagonal	radial
- maximum load (tyre manufacturer's)	17.6 kN	27.75 kN
- inflation pressure (tyre manufacturer's)	180 kPa	140 kPa
- dynamic radius index	590 mm	820 mm
Chosen track width	1810 mm	1800 mm

Oils and lubrication

Capacity and change interval

	Capacity dm ³	Oil change h	Filter change h
Engine	19	200	200 cleaning
Gear box ^{*)}	46	1600	400/100 cleaning
Front axle	3.5	1600	-
Final drive (front axle)	2 x 1.25	1600	
Final drive (rear)	2 x 4.5	1600	
Steering	7	800	1600

*) Includes rear axle and hydraulics.

	Recommended	Used during test
Engine oil - Type - Viscosity - Classification	Superol Milvus CC SAE15W/40	Recommended
Transmission oils - Type - Viscosity - Classification	Agrol "U" 41-50/cSt at 50°C SAE 80 API-CL 4	Recommended
Hydraulic fluid - Type - Viscosity - Classification	R3 to PN-75/C40005 4.2 SAE 70 R3	Recommended
Steering oil - Type - Viscosity - Classification	Hydraulic oil 10 7-13 5 WW 0243-25	Recommended

Grease

Universal grease LT 43

Number of lubrication points

21

Fuel

Type

Dieseloil, in conformity with national standards

Density at 15 °C

PTO test 841 g/dm³drawbar power test 835 g/dm³

Lifting heights relative to the horizontal plane including the lower link pivot points									
mm	-340	-300	-200	-100	0	100	200	300	330
Lifting forces (the values measured are corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting or to maximum power delivered by the hydraulic system, whichever is lower)									
At the hitch points kN	45.9	46.0	46.7	47.5	47.3	47.7	46.8	46.7	46.9
Corresponding pressure: 15.5 MPa									
At the frame kN		38.8	38.2	37.4	36.1	34.8	32.8	30.3	29.8
Corresponding pressure: 15.5 MPa									

3. DRAWBAR PERFORMANCE

Date of tests

8.-9., 13., 16. and 25.5.1991

Type of track

Tarmacadam

	Height of drawbar above ground	Tyre inflation pressure	
		Front	Rear
Unballasted	470 mm	130 kPa	120 kPa
Ballasted	470 mm	160 kPa	140 kPa

Gear and range	Power kW	Drawbar pull kN	Speed km/h	Engine speed rev/min	Slip of wheels or track %	Specific fuel consumption g/kWh	Specific energy kWh/l	Temperature			Atmospheric conditions		
								Fuel °C	Coolant °C	Engine Oil °C	Temperature °C	Relative humidity %	Pressure kPa
3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)													
I 1 L	30.4	48.7	2.3	2361	14.9	446	1.87	36	72	89	9	27	101.5
I 1 H	40.5	48.8	3.0	2353	15.0	393	2.12	35	79	86	9	27	101.5
I 2 L	47.9	48.1	3.6	2325	15.0	372	2.24	36	73	86	12	27	101.5
I 2 H	62.8	47.7	4.7	2291	15.0	334	2.50	37	72	87	11	27	101.5
I 3 L	75.3	46.6	5.8	2238	14.8	332	2.52	38	80	85	11	27	101.5
II 1 L	83.1	45.7	6.5	2182	14.3	308	2.71	41	77	87	11	27	101.5
I 3 H	86.3	38.8	8.0	2198	10.7	298	2.80	39	74	86	12	27	101.5
II 1 H	89.1	34.0	9.4	2200	8.3	282	2.96	42	75	87	13	27	101.5
II 2 L	87.2	26.6	11.8	2196	5.7	292	2.86	40	82	84	9	27	101.5
II 2 H	91.2	20.6	16.0	2181	4.4	281	2.98	37	78	90	8	27	101.5
II 3 L	87.8	15.7	20.2	2178	3.3	289	2.89	41	79	93	8	27	101.5
II 3 H	76.9	10.0	27.6	2205	2.0	324	2.58	41	78	93	7	27	101.5

Gear and range	Power kW	Drawbar pull kN	Speed km/h	Engine speed rev/min	Slip of wheels or track %	Specific fuel consumption g/kWh	Specific energy kWh/l	Temperature			Atmospheric conditions		
								Fuel °C	Coolant °C	Engine Oil °C	Temperature °C	Relative humidity %	Pressure kPa
3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)													
I1L	37.8	60.8	2.2	2352	15.0	400	2.09	43	80	91	18	25	100.8
I1H	50.3	61.2	3.0	2320	14.6	356	2.35	44	78	91	20	25	100.8
I2L	59.6	59.9	3.6	2312	14.7	343	2.43	45	74	90	16	25	100.8
I2H	76.8	58.7	4.7	2270	14.9	323	2.59	45	77	90	17	25	100.8
I3L	82.7	50.9	5.9	2191	12.4	306	2.73	47	79	89	22	25	100.8
II1L	86.6	44.6	7.0	2199	9.1	294	2.84	47	75	89	15	25	100.8
I3H	86.6	37.7	8.3	2202	8.1	293	2.85	48	74	89	14	25	100.8
II1H	88.4	33.4	9.5	2187	6.8	289	2.89	47	75	88	18	25	100.8
II2L	89.6	26.8	12.0	2196	4.1	283	2.95	47	82	87	16	25	100.8
II2H	85.1	18.8	16.3	2206	3.2	297	2.81	47	76	85	18	25	100.8
II3L	82.7	14.6	20.4	2188	2.7	300	2.78	51	82	96	14	25	100.8
II3H	77.1	10.0	27.6	2200	1.8	324	2.58	51	80	95	14	25	100.8
3.3.1 FIVE-HOUR TEST at 75% of pull at maximum power on gear H1													
III1L	68.5	33.5	7.4	2275	7.5	306	2.74	51	79	95	12	29	100.8
3.3.2 FIVE-HOUR TEST at pull corresponding to 15% wheelslip													
I2H	77.3	59.6	4.7	2254	-	-	-	56	80	97	15	23	101.6

Oil consumption during ten hours duration 110 g/h
of tests 3.3.1 and 3.3.2

4. TURNING AREA AND TURNING CIRCLE

	With brakes		Without brakes	
	Right-hand m	Left-hand m	Right-hand m	Left-hand m
Radius of turning area	5.35	5.10	6.15	5.90
Radius of turning circle	5.10	4.85	5.90	5.65

5. LOCATION OF CENTRE OF GRAVITY

Height above ground 1050 mm
Distance forward from the
vertical plane containing
the axis of the rear-wheels 1058 mm
Distance from the median
plane of the tractor 10 mm

6. BRAKING

Date of tests 24. - 25.7. and 4.10.1991

6.1 Cold service braking device test

	Speed before application of brakes km/h	Braking device control force kN	Mean deceleration m/s ²
Ballasted tractor	29.9	0.55	3.2
Unballasted tractor	29.6	0.38	3.0

6.2 Fade test

Speed before application of brakes km/h	Braking device control force kN	Mean deceleration m/s ²
29.8	0.60	3.2

Abnormal deviation of tractor from its
original course None

Abnormal vibration None

Brake heating method Actuating of brake for 1 km/h with
pedal force corresponding to 1 m/s²

6.3 Parking braking device test

	Uphill	Downhill
Braking device control force	0.30 kN	0.30 kN

7. MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests	8.11.1990
Sound level meter	
Make/Model/Type	Brüel & Kjaer 2209
Type of track	Tarmacadam
Gear Number	II 3H
Travelling speed before acceleration	22.4 km/h
Sound level	89 dB(A)
8. REPAIRS	None
9. REMARKS	None

STATE RESEARCH INSTITUTE OF ENGINEERING IN AGRICULTURE AND FORESTRY

May 14th 1992

Director



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